The Impact of Decentralization on Public Health System's Results. The Case of Romania

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Abstract. *This paper examines the impact of decentralization of the public health system on health state of the population by means of an adequate econometric model and data series at development regions level measured by two global indicators, namely infant mortality and life expectancy. The results point out that the number of beds and physicians by 1,000 inhabitants – as two of the independent variables considered – have a positive contribution to the health state, while the effects of decentralization have a pretty low visibility.*

Keywords: decentralization; public health system; reform; econometric models.

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I. Introduction

The decentralization of public services is a process in progress in all European countries. This process is based on subsidiarity principle and represents a means for increasing the efficiency in the public services sector.

After the radical change of the political system at the end of 1989, the decentralization of public administration has been applied in Romania as well. The process was difficult and long-standing, considering that during the communist regime the public service management was hyper-centralized. Over the transition years Romania benefited from a series of projects financed by the EU and the World Bank, aiming to support this complex process, covering a long period of time. For example, important Phare projects envisaging various components of public administration were launched in 1992 (amounting 1.5 million Euros), 1997 (5 million Euros), 2002 (4.73 million Euros), 2004 (two projects of 2.6 million Euros) and 2005-2006 (two more projects). Also, the PAL programme of the World Bank financed activities which contributed to the consolidation of the institutional framework of public administration decentralization.

The reform of the public health system was considered a component of public administration reform and a series of corresponding measures were applied, especially with regard to priority programmes for public health system, the creation of a national network of health system operators able to support the public administration reform, the training in public administration of health system staff, etc.

In the international literature there are many papers which analyze the correlation between decentralization of the health system and the corresponding service quality. In this respect country case studies like those for Spain (Cantarero, Pascual, 2008, Cantarero, 2005) and Italy (Giannoni, Hitiris, 2002) can be mentioned.

This paper proposes the evaluation of decentralization effects upon the quality of health services in Romania, also aiming to compare them to those obtained by Cantarero and Pascual (2008) in the case of Spain.

The paper is organized as follows. Section 2 introduces the econometric model which has been employed for measuring the decentralization effects in the public health sector. Section 3 discusses the results obtained after the estimation of regression parameters, using data recorded at Romanian development regions level for 1998-2005. The last section focuses on conclusions and final remarks.

II. The model

Data series for statistical indicators recorded at the eight development regions level between 1998 and 2005 were used in order to analyze the impact of decentralization of public health sector on some relevant demographic indicators. Table 1 presents a series of aspects regarding both the dependent variable and the independent ones, which have been employed by the econometric model

Table 1

The model's variables

Dependent variable H –	
RMI	Infant mortality rate
DVT	The average life expectancy. In national statistics it is evaluated at the development region level as an average of three consecutive years. The series of data has been built considering that each value corresponds to the median year
Independent variables	
PIB_R	GDP per capita at the development regions level. The model used all values expressed in 1998 prices
P_SSA	The share of each region in the contribution of health and social assistance system to GDP formation
M_P	Number of physicians per 1000 inhabitants
P_P	Number of beds per 1000 inhabitants

Data source: Statistical Yearbook of Romania, 2007, National Institute of Statistics, Bucharest.

Considering the complexity of reform in the Romanian public health system as well as the difficulties of measuring the decentralization process intensity, the identification of one or more statistical indicators able to measure the effects of decentralization in a country's public health sector is not an easy task. For our research we have proposed a model inspired from the previous experience of a Spanish scientist in this field, who employed the ratio of sub-national health care expenditures to the total health expenditures for all the levels of government (Cantarero, 2008).

In accordance with the model estimated for the case of Spain, our model is defined as follows:

$$\log(H_{it}) = a + b \times PIB\_R_{it} + c \times \log(M\_P_{it}) + d \times P\_P_{it} + \varepsilon_{it},\ i = \overline{1.8},\ t = \overline{1998.2005}$$

The following variables have been used:

- H_{it} is an indicator which characterizes the global performance of the public health system in region i, year t. As the model has been elaborated for two cases, two dependent variables have been used. Thus, in the first case the dependent variable is the infant mortality rate calculated for each year at the development regions level. In the second case the dependent variable is the average life expectancy at development region level.

- The independent variables are: (i) PIB_R – GDP per capita at the development regions level and P_SSA – the share of each development region in the contribution of health and social assistance system to GDP formation, in order to characterize the economy and the health sector at development region level ; (ii) two variables which refer to the local health system's resources, namely P_P – the number of beds per 1,000 inhabitants and M_P – the number of physicians per 1,000 inhabitants.

- ε_{it} is the residual variable of zero average which observes auto-correlation and homoskedasticity hypotheses and is not correlated with other explaining variables.

III. The results

The model parameters for the two cases have been estimated for both fixed effects model and random effects model. Two methods have been applied for parameters estimation, namely ordinary least squares method (OLS) and the two stage least squares method (TSLS), the latter as described by Baltagi (2008). The results obtained by means of EViews are presented in Table 2 and Table 3.

For the fixed effects model the null hypothesis has been tested: according to this hypothesis, the specific effects at region level are neglected. In this case, a Fischer test is necessary. The statistics values calculated for the parameters estimated by OLS and TSLS are higher than those from the F distribution table, which shows that the specific effects at region level are significant.

This fact is obvious if we have in mind the large disparities between the eight development regions in terms of economic and social development.

Table 2

The characteristics of the model with dependent variable log(RMI)

	Classic Model		Fixed effects		Random effects	
	LS	TSLS	LS	TSLS	LS	TSLS
C (coefficient)	0.7619	0.8310	1.7222	1.3773	1.0985	0.8768
t-Statistic	(1.84)	(1.69)	(3.46)	(2.10)	(2.61)	(1.83)
Log(PIB_R) (coefficient)	-0.3424	-0.3314	-0.3311	-0.3477	-0.3118	-0.3554
t-Statistic	(-5.47)	(-4.34)	(-4.83)	(-4.53)	(-4.98)	(-4.80)
P_SSA (coefficient)	0.8620	0.5591	0.1015	2.6871	0.4989	-0.0294
t-Statistic	(1.42)	(0.86)	(0.06)	(0.78)	(0.51)	(-0.03)
log(M_P) (coefficient)	-0.1873	-0.2405	-0.6558	-0.6895	-0.2059	-0.1697
t-Statistic	(-1.84)	(-2,16)	(-4.06)	(-3.85)	(-2.11)	(-1.55)
P_P (coefficient)	-0.0050	-0.0054	-0.0683	-0.0763	-0.0169	-0.0184
t-Statistic	(-0.31)	(-0.30)	(-3.20)	(-3.24)	(-1.11)	(-1.16)
R-squared	0.8270	0.8248	0.9116	0.9070	0.6404	0.6357
F-statistic and Prob (F)	60.94 (0.0000)		41.24 (0.0000)		22.71 (0.0000)	
F-statistic (Classic Model vs Fixed effects) and Prob (F)	6.56 (0.000)	6.06 (0.000)				
Hausman statistic and Prob (Hausman)			15.443 (0.000)	26.004 (0.000)		

Source: Authors' calculations by means of data series described in Table 1.

Table 3

The characteristics of the model with dependent variable log(DVT)

	Classic Model		Fixed effects		Random effects	
	LS	TSLS	LS	TSLS	LS	TSLS
C (coefficient)	4.4740	4.5319	4.3875	4.4737	4.4220	4.4784
t-Statistic	(92.90)	(77.31)	(103.74)	(76.58)	(113.05)	(96.11)
log(PIB_R) (coefficient)	0.0336	0.0438	0.0303	0.0379	0.0270	0.0418
t-Statistic	(4.60)	(4.81)	(5.22)	(5.55)	(4.79)	(6.20)
P_SSA (coefficient)	0.1714	0.2500	-0.1749	-0.5086	0.0100	0.3583
t-Statistic	(2.42)	(3.22)	(-1.20)	(-1.66)	(0.08)	(2.01)
log(M_P) (coefficient)	0.0097	0.0097	0.0788	0.0691	0.0280	0.0062
t-Statistic	(0.88)	(0.88)	(5.74)	(4.33)	(2.87)	(0.57)
P_P (coefficient)	-0.0040	-0.0034	0.0043	0.0056	-0.0015	-0.0004
t-Statistic	(-2.06)	(-1.61)	(5.22)	(2.68)	(-1.07)	(-0.28)
R-squared	0.5805	0.5544	0.8863	0.8686	0.5252	0.8686
F-statistic and	17.64		31.19		14.10	
Prob (F)	(0.0000)		(0.0000)		(0.0000)	
F-statistic (Classic Model vs	18.45	16.40				
Fixed effects) and Prob (F)	(0.000)	(0.000)				
Hausman statistic and			48.29	71.02		
Prob (Hausman)			(0.000)	(0.000)		

Source: Authors' calculations by means of data series described in Table 1.

The results obtained show that the infant mortality variable is negatively correlated with PIB_R, M_P and P_P variables, whereas P_SSA variable has not a significant influence on the dependent variable.

Subsequently, the average life expectancy is positively correlated with PIB_R, M_P and P_P variables, while the correlation with P_SSA variable is negative and this correlation is weak. In order to test the orthogonality of the random effect and explaining variables, the Hausman test has been used (Baltagi, 2008). The test statistics values for both models support the use of the fixed effects models.

Moreover, when the same test is applied in order to choose between the results obtained by OLS and TSLS, it reveals that the second case is more relevant.

IV. Concluding remarks

Our paper has analyzed the relationship between infant mortality rate, respectively life expectancy and the factors which measure the characteristics of the decentralization of the public health system in Romania. In order to validate the conclusions, the parameters of the linear regression model have been estimated using the data series at the eight development regions level for 1998-2005. On this basis several conclusions can be formulated.

First, the results displayed in Table 2 and Table 3 point out that the infant mortality rate is negatively correlated with the variable which characterizes the economic development level (GDP per capita), with the number of beds and the number of physicians per 1,000 inhabitants.

Second, the life expectancy is positively correlated with the variable which characterizes the economic development level (GDP per capita).

Third, the specific factors at region level have a significant influence on infant mortality rate and life expectancy.

Fourth, we have to mention the lack of considerably positive effects of decentralization process on the outputs of public health system. The main explanation comes from the fact that, after its joining to the European Union, there are a lot of projects that still support the decentralization process in Romania. It is expected that the effects of the changes in the public health system determined by decentralization will be much more visible in the forthcoming years.

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